

National Adult Clozapine Titration Chart User Guide

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This document is available on the Commission web site at www.safetyandquality.gov.au

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National Adult Clozapine Titration Chart User Guide

The Australian Commission on Safety and Quality in Health Care surveyed psychiatric acute service users of the *National Inpatient Medication Chart* (NIMC) in late 2011. The survey found that many services had issues with ordering and recording titrating clozapine doses on the NIMC and that it presented a barrier to effective, standardised use of the NIMC. The survey report recommended that a national adult clozapine titration chart be made available to assist acute services manage titration of clozapine.

The *National Adult Clozapine Titration Chart* is based on the significant work of Queensland Health Safe and Quality Use of Medicines, Medication Services Queensland, the Clozapine Working Party and representatives from Royal Brisbane and Women's Hospital, Logan, Mackay and Ipswich hospitals.

Development of the Queensland Health *Adult Clozapine Titration Chart* with decision support tools was identified as an action item in *Medication Management in Queensland Mental Health Services: Scoping study of quality use of medicines in Queensland Mental Health Services 2011* and which was endorsed by the Queensland Psychotropic Medication Advisory Committee.

Queensland Health kindly agreed to the *Adult Clozapine Titration Chart* being made available through the Commission for use by other Australian health services. The *National Adult Clozapine Titration Chart* version is a version of the Queensland Health chart that has been modified for national use.

1. Purpose

The *National Adult Clozapine Titration Chart* is intended to be used as a record of the prescribing, monitoring and administration of clozapine titration. When clozapine is used for maintenance treatment, the *National Inpatient Medication Chart* (NIMC) is to be used.

Consistent documentation allows accurate interpretation of orders

The *National Adult Clozapine Titration Chart* (NACTC) is intended to reflect best practice and assist clinicians to safely prescribe, dispense, administer and monitor patients commencing on a clozapine titration regimen and minimise the risk of adverse drug events.

Research shows that many adverse events reported in Australian hospitals are associated with medications. It also demonstrates that improvements to medication chart design can improve the safety of medication processes in hospitals.

The following are general requirements regarding use of the NACTC:

- National and local legislation, regulation and policies will apply to ensure this highly specialised drug is prescribed supplied, administered and monitored safely. Current requirements include:
 - o Registration with a clozapine patient monitoring service (CPMS)
 - o Pre-treatment haematological and metabolic screening
 - o Ongoing haematological and metabolic monitoring

- The NACTC should be used for patients who are on a titrating clozapine regimen. Maintenance doses should be ordered on the *National Inpatient Medication Chart* (NIMC).

2. General instructions

All orders are to be written legibly in ink. No matter how accurate or complete an order is, it may be misinterpreted if it cannot be read. Water soluble ink (e.g. fountain pen) should not be used. Black ink is preferred.

A medication order is valid only if the authorised prescriber enters all the required items.

Only accepted abbreviations may be used (refer to the *National Recommendations for Terminology, Abbreviations and Symbols to be used in the Prescribing and Administering of Medicines* in Appendix A).

Dangerous abbreviations must be avoided.

No erasers or “whiteout” can be used i.e. orders MUST be rewritten if any changes are made, especially changes to dose and/or frequency

Adult Clozapine Titration Chart

Facility / Service: _____

Ward / Unit: _____ Year: **20** _____

Clozapine Patient Number (CPN): _____

The patient’s current hospital and ward location should be clearly marked on the *Clozapine Titration Chart* (NACTC). These details should be kept up to date if changes are made e.g. if a patient moves wards.

Please complete the pre-printed year “20.....”

The Clozapine Patient Number (CPN), and which is issued by the clozapine patient monitoring service, is recorded in the same section.

MEDICATION Chart No. _____ **of** _____

ADDITIONAL CHARTS

☐ IV Fluid	☐ BGL/Insulin	☐ Acute Pain	☒ Other
☐ Palliative Care	☐ Chemotherapy	☐ IV Heparin	<i>Clozapine Titration</i>

A notation is to be made on the NIMC stating the patient has an *National Adult Clozapine Titration Chart* (NACTC) in use. Do this by ticking ‘Other’ on the NIMC and write **clozapine titration** next to ‘Other’ to alert clinicians that the patient has an NACTC in use.

3. Pages 1 and 2

3.1. Identification of the patient

(Affix identification label here)	
URN:	NOT A VALID PRESCRIPTION UNLESS IDENTIFIERS PRESENT
Family name:	
Given name(s):	
Address:	
Date of birth:	
Sex:	☐ M ☐ F ☐ I
First Prescriber to Print Patient Name and Check Label Correct:	

Incomplete patient identifiers and patient identification that is not visible on all sections of the NACTC may result in an adverse drug event in which the medication is administered to the wrong patient.

A watermark has been placed on the patient identification section as a reminder that a prescription is not valid and medication cannot be administered unless the patient's identifiers are present i.e.:

EITHER

1. current patient identification (ID) label

OR

2. as a minimum, written in legible print, the patient:
 - a. Name
 - b. UR number
 - c. Date of birth
 - d. Gender (M = Male; F = Female; I = Indeterminate)

If a current patient ID label is used, the first prescriber must print the patient's name under the label to verify that both the ID label and the medication orders relate to the correct patient. **This will reduce the risk of the wrong ID label being placed on the chart.** The patient identification details are to be recorded on pages 2 and 4 by the first prescriber.

Clozapine cannot be administered if the prescriber has not documented the patient identification.

Family name:	Given name(s):	URN:
--------------	----------------	------

The patient's family name, given name and URN are recorded at the top of page 3 as an additional identification check.

3.2. Allergies and adverse drug reactions

Incomplete previous allergies and adverse drug reactions (ADR) documentation, and lack of clear alerts, can result in patient harm by re-exposing the patient to a drug to which a previous ADR has occurred. Each patient should have the name of the substance that has caused a previous ADR as well as the nature of the reaction recorded on their NIMC.

The NACTC has a section for the “Attach ADR Sticker (See Medication Chart for Details)”.

If a previous ADR exists, this must be documented on the NIMC.

On the NACTC, affix an ADR alert sticker to page 2 in the space provided, for example:

Attach ADR Sticker

(See Medication Chart for details)

4. Page 1 Clozapine monitoring

Metabolic and haematological monitoring of patients is required as clozapine is associated with a number of serious adverse effects such as blood dyscrasias, myocarditis and cardiomyopathy. The collection and recording of baseline, then periodic, measurements is recommended to ensure early detection of serious adverse effects. White blood cell count and neutrophil blood count are required to be registered with a clozapine patient monitoring service (CPMS) prior to dispensing clozapine.

Patients require a full medical examination prior to the planned initiation of clozapine. A check list of investigations required for clozapine monitoring is provided in the table on page 1 of the NACTC. Baseline tests required should be flagged by the prescriber by ticking the ‘if required’ column. There is a section for baseline, day 7, 14, 21 and 28 test results to be documented. The shaded sections indicate that these tests are not necessary at this time but they can be instigated at the request of the treating psychiatrist. The last column of the chart indicates the recommended frequency of each test after the initial titration period.

If any of these tests return results outside normal parameters, or if results reveal particular physical health concerns, these should be raised with the treating team who must make a decision on whether or not to proceed with the prescribed course of treatment.

These are suggested guidelines only and the treating psychiatrist may request further tests according to the clinical results or hospital policy. A tick box “if required” column is available to indicate if specific tests are required e.g. instead of ordering a full blood count (FBC), a neutrophils test may be ordered.

It is expected that the patient results will be checked and recorded primarily by medical officers using the check list on the NACTC with references for Normal and

Abnormal test parameters available from the pathology system and documented in the clinical notes.

The *Clozapine Monitoring Investigations* in the NACTC have been modified from the *Maudsley Prescribing Guidelines*.

Clozapine Monitoring *												
Investigations	if required (✓)	Results										After 28 days
		Baseline		Date (day 7): / /		Date (day 14): / /		Date (day 21): / /		Date (day 28): / /		
		Date completed	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	
Full Blood Count (FBC)	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	Then continue weekly first 18 weeks then monthly
White Blood Cell (WBC)	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	
Neutrophils	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	
Eosinophils	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	
Troponin	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	Then at 3 months then annually
C-Reactive Protein (CRP)	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	
Electro Cardiograph (ECG)	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	Then continue as per QH Safe and Quality use of Clozapine Procedure
Liver Function Test (LFT)	☐		☐	☐								
Urea and Electrolytes (U&E)	☐		☐	☐								
Blood group	☐											
Plasma glucose - fasting	☐		☐	☐								Then at 6 months then 12 months
Total cholesterol - fasting	☐		☐	☐								
Low Density Lipoprotein - fasting (LDL)	☐		☐	☐								Then at 3 months then every 6 months
High Density Lipoprotein - fasting (HDL)	☐		☐	☐								
Triglycerides - fasting	☐		☐	☐								
Beta Human Chorionic Gonadotropin - female (Beta HCG)	☐		☐ +	☐ -								As required
Cardiac ECHO	☐		☐	☐								Then continue as per QH Safe and Quality use of Clozapine Procedure
Clozapine level	☐											
Full physical exam	☐		☐	☐								
Height	☐			m								
Weight	☐			kg		kg		kg		kg		Then continue monthly
Waist	☐			cm						cm		
BMI [weight (kg) / height (m ²)]	☐											
Smoking - cigarettes per day	☐											As required

These are suggested guidelines only, refer to the treating psychiatrist for individual monitoring requirements. Check Auslab / Auscare for Normal and Abnormal test parameters.

* Modified from: Taylor D Paton C, Kapur S. The Maudsley Prescribing Guidelines. 10th ed. London(UK):Informa Healthcare UK Ltd; 2009.

Full Blood Count (FBC)

A pre-treatment full blood count is a requirement for registering a patient with a clozapine patient monitoring service (CPMS). The test is to be repeated weekly for 18 weeks and then monthly. The results are recorded and sent to a CPMS prior to

prescribing. The NACTC has an area for recording this result for 4 weeks and the subsequent results are then recorded in the clinical file.

White Blood Count (WBC)

Clozapine can only be commenced if a white blood cell count (WBC) is greater than $3.5 \times 10^9/L$. If the WBC is $3.0\text{--}3.5 \times 10^9/L$, the blood test should be repeated in one week. If the blood results remain in this range clozapine treatment can commence under medical supervision. The results are sent to the CPMS for recording prior to writing the order. This blood test is to be done weekly for 18 weeks and then monthly.

Neutrophils

A neutrophil count of greater than $2.0 \times 10^9/L$ is required to commence clozapine treatment. The results are sent to the CPMS for recording prior to writing the prescription. This blood test is to be done weekly for 18 weeks and then monthly.

Eosinophils

Unexplained eosinophilia may occur, especially in the initial weeks of treatment with clozapine. Discontinuation of therapy is recommended if the eosinophil count rises above $3.0 \times 10^9/L$. Therapy should restart only after the eosinophil count has fallen below $1.0 \times 10^9/L$ and at the discretion of the treating psychiatrist. This blood test is to be done weekly for 18 weeks and then monthly.

Troponin

Initially the presence of non-specific cardiac symptoms and family history of heart failure should be noted. Testing to measure the baseline markers of myocardial damage include using a troponin I or T assay and serum creatinine. Alternatively, where a troponin test is not available, creatine kinase monobasic isoenzyme (CK-MB) could be used. This blood test is to be done weekly for 18 weeks and then 3 monthly then annually.

C-Reactive Protein (CRP)

CRP is a non-specific marker of inflammation and may provide an early warning of the development of myocarditis caused by clozapine. This blood test is to be done weekly for 18 weeks and then 3 monthly then annually.

Electrocardiograph (ECG)

A baseline ECG is required. It is recommended to be repeated at 3 months and then every 6 months.

Liver Function Test (LFT)

A baseline LFT is required. If results are outside normal parameters, commencement of clozapine is at the discretion of the treating psychiatrist. It is recommended that LFT be tested annually.

Urea & Electrolytes (U&E)

A baseline U&E test is required. It is recommended that U&E be tested annually

Blood Group

This is required for registration and identification purposes by the CPMS.

Plasma glucose (fasting)

It is a requirement of CPMS registration that the fasting plasma glucose level of the patient is measured.

Total Cholesterol (fasting)

Increases in cholesterol levels have been observed in patients taking clozapine; a baseline level should be taken pre-treatment.

Low Density Lipoprotein (LDL) (fasting)

A baseline LDL level is required. It is recommended to be tested at 3 months and then every 6 months.

High Density Lipoprotein (HDL) (fasting)

A baseline HDL level is required. It is recommended to be tested at 3 months and then every 6 months.

Triglycerides(fasting)

A baseline triglyceride level is required. It is recommended to be tested at 3 months and then every 6 months.

Beta Human Chorionic Gonadotropin – female (Beta HCG)

A beta HCG test should be done to confirm if the patient is pregnant. The adverse pharmacological and toxicological effects of clozapine in adults may also occur in the foetus. Therefore, clozapine should not be used in pregnancy or in women likely to become pregnant, unless the expected benefit of treatment is considered to outweigh the potential risk to the foetus.

Cardiac ECHO (Echocardiogram)

It is advised that patients undergo echocardiography to test for the development of adverse cardiac events and to provide a baseline reading against which any future events may be measured. Then follow local procedures/ guidelines.

Clozapine level

When a patient has ceased clozapine and is being considered for re-titration or recommencement, a serum clozapine level needs to be measured prior to initiation. The frequency of this test is at the discretion of the treating psychiatrist.

Full physical examination

A full medical examination is required prior to commencement of clozapine.

Height

Height is recorded in metres to assist with Body Mass Index calculation.

Weight

An area has been provided for a base line and weekly recording of a patient's weight in kilograms (and in which "kg" is pre-printed).

Waist

A baseline waist measurement is required and recorded in centimetres with "cm" pre-printed on the NACTC. Weekly recording of waist measurement is recommended as an increase in waist measurement is a sign of weight gain.

Body Mass Index (BMI)

The body mass index is required as a measure of metabolic changes that may occur with clozapine treatment. (BMI = weight (kg) / height (m))

Smoking (cigarettes per day)

Baseline smoking habits, followed by weekly recordings, are required to be documented. Abrupt cessation of smoking may lead to clozapine toxicity. Patients who smoke need to be informed that their prescriber must be informed if they should stop smoking as dose adjustment may be necessary.

5. Pages 2 and 3

5.1. Reminder to register patient prior to prescribing clozapine

Adult Clozapine Titration Chart		
Facility / Service:		
Ward / Unit:	Year: 20	
Clozapine Patient Number (CPN):		

Do not prescribe clozapine until approvals obtained consistent with local procedure

Clozapine can only be initiated with patients who have been registered with a clozapine patient monitoring service (CPMS) and been given a Clozapine Patient Number (CPN).

The CPN is documented along with the Ward / Unit and Facility / Service. A psychiatrist or prescriber must be registered as a clozapine prescriber prior to prescribing clozapine. A pharmacist must also be registered in order to dispense clozapine.

5.2. Medication orders

Date	Medication Clozapine	
Route Oral	Frequency Morning	Prescriber to enter individual doses.
Prescriber's signature		
Prescriber's name (please print)		
Contact details		
Pharmacy		
Comments		

Date	Medication Clozapine	
Route Oral	Frequency Evening	Prescriber to enter individual doses.
Prescriber's signature		
Prescriber's name (please print)		
Contact details		
Pharmacy		
Comments		

Date

This is the date the medication order is written.

Medication

Clozapine has been pre-printed in the medication orders section. Space is available for the prescriber to specify suspension or tablet if required.

Route

Oral has been pre-printed.

Frequency

The NACTC allows for Daily or Twice Daily (BD) dosing during the titration period. Morning and Evening have been pre-printed on the respective medication orders.

Prescriber to enter individual doses

This instruction has been pre-printed as a reminder for the prescriber to enter each individual dose.

Prescriber's signature, name and contact

The prescriber must sign to complete each clozapine order. The prescriber's name should be printed legibly on the clozapine order. Contact details should be entered by the prescriber, there is room to include a mobile or pager number.

Pharmacy

This section is for use by the clinical pharmacist.

Comments

The intention of this area is to provide clinicians with an area to document additional comments e.g. reasons drug orders were ceased.

Evening Titration Doses Only

The prescriber MUST put a line through the *Morning* clozapine order to remind staff it is not to be administered.

Date	Medication Clozapine		Day						
Route Oral	Frequency Morning	Prescriber to enter individual doses.	Date (day / month)						
Prescriber's signature			Dose						
Prescriber's name (please print)				mg	mg	mg	mg	mg	mg
Contact details									
Pharmacy			Prescriber (initials)						
Comments			0800hrs Nurse (initials)						
Date	Medication								

Not to be administered

5.3. Prescribing doses prescription and recording administration

The clozapine administration record provides space to record up to 28 days of therapy. The following headings are pre-printed at the beginning prior to day one and at the end of the nursing administration section after day 28.

Day

The numbers 1 to 28 are watermarked in the *Day* line on the NACTC to assist with prescribing and administering. If clozapine is ceased and then recommenced, the watermarked days can be overwritten as required.

Prescribing

Date

The prescriber is to enter the date (day and month) for each day clozapine is prescribed. A diagonal line has been pre-printed to separate the day from the month.

Dose

Refer to the Clozapine Titration Schedule (page 2) for an example of a regimen used to titrate clozapine. As clozapine is being titrated, it is necessary for the prescriber to write each individual dose on each day.

- Doses must be written using metric and Arabic (1, 2, 3) systems. Never use Roman numerals (i, ii, iii, iv).
- Never use a trailing zero (.0) after a decimal point as it may be misread if the decimal point is missed (e.g. 1.0 misread as 10)
- “mg” has been pre-printed in the daily individual dose section of the NACTC.

Refer to the *National Recommendations for Terminology, Abbreviations and Symbols to be used in the Prescribing and Administering of Medicines* in Appendix A..

Prescriber initials

As more than one prescriber may be involved in prescribing clozapine on the NACTC, the prescriber must write their initials in the section under the dose each day to complete the medication order.

Recording administration

0800hrs and 2000hrs Nurse initials

The time 0800hrs and 2000hrs have been pre-printed on the NACTC. If the patient receives a clozapine dose outside of these times, the nurse can write the time clozapine was administered above their initials.

Pharmacist Review

Prescriber (Initials)							
2000hrs Nurse (Initials)							
Pharmacist Review							

The clinician undertaking the pharmaceutical review will sign this section as a record that they have reviewed the NACTC (on the corresponding day) to ensure that all orders are clear, safe and appropriate for that individual patient.

Shading

The shading of alternate columns is a visual aid for reading down the column. It is intended to help reduce the risk of administering a medication on the wrong day.

Day	1	2	3	4	5	6	7
Date (day / month)							
Dose							
	mg	mg	mg	mg	mg	mg	mg
Prescriber (Initials)							
0800hrs Nurse (Initials)							

5.4. Clozapine Titration Schedule

Clozapine Titration Schedule (this table is a guide only)														
If rapid or slower titration required refer to the treating psychiatrist.														
In an attempt to minimise side effects the following dosing schedule is suggested:														
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Morning	12.5mg	25mg	25mg	25mg	25mg	25mg	25mg	25mg	50mg	50mg	50mg	50mg	50mg	50mg
Evening				25mg	25mg	50mg	75mg	100mg	100mg	100mg	125mg	125mg	125mg	150mg

Titration beyond 200mg/day: If well tolerated the daily dose may be increased slowly in increments of 25–50mg.
(Modified from Clozapine Titration Protocols)

An example of a clozapine titration schedule has been included on the chart to assist with prescribing. The patient should have a regular medical and nursing review to identify adverse reactions and efficacy of clozapine treatment.

For suggested nursing observations, refer to the Observation Procedure on the NACTC (Page 4). Advice can be sought from the treating psychiatrist if a different titration regimen is required. The evening dose section has a cross through the boxes on the first three days as a reminder for the prescriber to use this safety measure when prescribing clozapine. Every second day is shaded to correspond with the administration section.

5.5. Recommencing clozapine if dose missed for greater than 48 hours

Dosing recommendations if clozapine dose is missed for greater than 48 hours
- Obtain psychiatric review prior to recommencing clozapine. - Recommence at 12.5mg once or twice daily on the first day. If well tolerated the dose may be increased slowly as per the <i>Clozapine Titration Schedule</i>. This is a guide only - for further dosing options refer to treating psychiatrist. For frequency of blood testing required, refer to <i>Blood Test Monitoring</i> section on page 4.

A psychiatric review must be performed prior to recommencing clozapine treatment. When the interval since the last dose of clozapine exceeds 48 hours, treatment is generally reinstated with a 12.5mg dose given once or twice daily on the first day to assist in reducing the possibility of side effects. If this is well tolerated, titration can continue according to the clozapine titration schedule. A more rapid titration must be under the direction and supervision of the treating psychiatrist.

Regular medical and nursing reviews are required.

5.6. Reasons for not administering doses

Reason For Not Administering (codes must be circled)			
Absent	(A)	Refused - notify Dr	(R)
Fasting	(F)	Self Administered - observed or claimed	(S)
On leave	(L)	Vomiting - notify Dr	(V)
Not available - obtain supply and / or notify Dr, consider incident report	(N)	Withheld - enter reason in clinical record	(W)

When it is not possible to administer the prescribed clozapine, a "Reason for not administering" code must be recorded and circled. (Also refer to Appendix A.) Circling the code prevents confusion with initials. The relevant code should be entered for all doses not given. Do not leave blanks. If a patient refuses clozapine, then the medical officer must be notified. If clozapine is withheld, the reason must be documented in the patient's medical notes and the medical officer must be notified.

5.7. Clozapine Blood Results Monitoring System

Clozapine Blood Results Monitoring System		Recommended Action
Green Range	WBC greater than $3.5 \times 10^9/L$ and Neutrophils greater than $2.0 \times 10^9/L$	Continue clozapine therapy.
Amber Range	WBC $3.0-3.5 \times 10^9/L$ or Neutrophils $1.5-2.0 \times 10^9/L$	Continue clozapine therapy with twice-weekly blood tests until return to 'green' range.
Red Range	WBC less than $3.0 \times 10^9/L$ or Neutrophils less than $1.5 \times 10^9/L$	Stop clozapine therapy immediately. Refer to clozapine protocols for management guidelines.

Clozapine can cause a reduction in the number of white blood cells in patients and regular blood sampling is required to identify this. An alert system which gives guidance on whether therapy should be continued or ceased according to the patient's blood result is provided on page 3.

5.8. Weekly monitoring

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
-----	---	---	---	---	---	---	---	---	---	----	----	----	----	----

A red coloured heart symbol is printed on days 7, 14, 21 and 28 as a reminder that patients require blood or metabolic monitoring on a weekly basis as indicated on the Clozapine Commencement Monitoring: Baseline Measurements section of the NACTC.

♥ Conduct weekly blood monitoring as per *Clozapine Monitoring* on page 1

Additional tests may be indicated by the prescriber drawing a darkened line around the day box on the required day for testing.

Date	Medication Clozapine		Day														
Route Oral	Frequency Morning	Prescriber to enter individual doses.	Date (day / month)	1 9	2 9	3 9	4 9	5 9	6 9	7 9	8 9	9 9	10 9	11 9	12 9	13 9	14 9
Prescriber's signature 			Dose	12.5	25	25	25	25	25	25	25	50	50	50	50	50	50
Prescriber's name (please print) G. Bedford				mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg
Contact details Page 2010			Prescriber (initials)														
Pharmacy M. Duguid			0800hrs Nurse (initials)	A.R.	A.R.	P.S.	S.T.	S.T.	C.R.	C.L.	A.N.	A.N.	S.T.	S.T.	C.R.	C.R.	C.R.
Comments																	

5.9. Ceased medicines

When ceasing a medication, the original order must be readable. The clinician ceasing the order must draw a clear line through the order in both the prescription and the administration record sections, taking care that the line does not cover other orders.

The prescriber must write the reason for changing the order, (e.g. cease, written in error), the date the order was ceased and their initials in the administration record section. This documentation facilitates communication of the patient's medication management plan with all team members, and enables medication reconciliation to be performed when the patient is discharged.

When a medication order needs to be changed or a dose increased or decreased, the prescriber must not overwrite the order. The original order must be ceased and a new order written.

Note: The acronym "D/C" (discontinued) should not be used for ceased orders since this can be confused with "Discharge". Always use "Ceased".

Prescribing examples

The clozapine titration schedule included on the NACTC recommends morning doses on the first three days and increasing to twice daily doses on the fourth day and onwards.

To minimise opportunity for error it is recommended to put a cross through the days the dose is not required to be administered.

Date	Medication Clozapine		Dose														
Route Oral	Frequency Evening	Prescriber to enter individual doses.		X	X	X	25	25	50	75	100	100	100	125	125	125	150
Prescriber's signature 				mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg
Prescriber's name (please print) G. Bedford			Prescriber (initials)														
Contact details Page 2010			2000hrs Nurse (initials)				A.R.	A.R.	A.R.	A.R.	S.T.	S.T.	A.W.	A.W.	S.T.	S.T.	S.T.
Pharmacy M. Duguid			Pharmacist Review				M.D.	M.D.	M.D.	M.D.	M.D.	M.D.	M.D.	M.D.	M.D.	M.D.	M.D.
Comments																	

6. Page 4

6.1 Pre Commencement

Pre Commencement

- Assess current smoking status
- Review and document medical history
- Provide and explain clozapine information to consumer and family/carer
- Complete local clozapine prescribing requirements
- Inform local authorities as required
- Provide pharmacist with blood test results and prescription
- Complete all locally required authorisations
- Complete *Clozapine Monitoring* see page 1

In order to minimise the effect of haematological adverse events, health professionals treating patients with clozapine are required to register their patients with a clozapine patient monitoring service (CPMS).

All patients, prescribers, dispensing pharmacists, clozapine coordinators and centres using clozapine must be registered with the CPMS.

Refer to local procedures or guidelines for pre-commencement tests and specific paperwork requirements needed to commence a patient on clozapine.

6.2 Blood Test Monitoring

Blood Test Monitoring

- If clozapine dose missed for 72 hours or less:
- Monitoring should continue as normal with no additional requirements
- If clozapine dose missed for 72 hours but less than 4 weeks:
- During the first 18 weeks - monitor weekly for at least 6 weeks or for as long as necessary to achieve a total of 18 weeks monitoring. For example if therapy is interrupted:
 - » a) after 15 weeks monitor with weekly blood tests for 6 weeks after clozapine is recommenced
 - » b) after 9 weeks monitor with weekly blood tests for 9 weeks after clozapine is recommenced
 - Consumers on monthly monitoring - monitor weekly for 6 weeks then continue with monthly monitoring if no problems detected
- If clozapine dose missed for 4 weeks:
- Monitoring should recommence as for a new consumer

All patients recommencing clozapine following an interruption in treatment must have a pre-treatment blood test. This includes patients with therapy interruptions of less than a week.

6.3 Observation Procedure

Observation Procedure

Refer to hospital procedure. Where this is unavailable the following are suggested monitoring guidelines.

For Initial Dose:

1. Take temperature, pulse, respiration (TPR), and lying and standing blood pressure (BP) prior to administration of clozapine
2. Administer clozapine as prescribed
3. Repeat observations:
 - » Half hourly for 2 hours
 - » 1 hourly for 4 hours
4. If above observations are outside normal parameters, seek medical review

Subsequent Dose:

1. Twice daily - TPR and lying and standing BP
2. Take observations pre-dose, and 4-6 hours post-dose

Smoking:

- If change in smoking status notify Medical Officer

Patients must be kept under close supervision and their vital signs monitored for six hours following the first dose of clozapine. Any adverse events associated with the initial and subsequent doses need to be referred to a doctor and recorded. Subsequent doses should have vital signs monitored twice daily.

Temperature

Transient elevations of temperature are most common in the first three weeks of treatment. Raised temperatures above 38°C should be investigated to rule out the possibility of underlying infection, neutropaenia or neuroleptic malignancy syndrome.

Pulse

Clozapine is associated with an increased risk of myocarditis, especially in the first 2 months of treatment. Cases of cardiomyopathy have also been reported. Persistent tachycardia at rest, or tachycardia accompanied by palpitations, arrhythmias, chest pain, shortness of breath or symptoms of heart failure should be urgently investigated for myocarditis or cardiomyopathy. If myocarditis or cardiomyopathy is diagnosed or suspected, stop clozapine and refer to a cardiologist.

Blood Pressure (lying and standing)

Hypotension and circulatory collapse may be profound and may be accompanied by cardiac and / or respiratory arrest. This occurs most commonly during the titration period. This risk is reduced by small, slow increases in dose. Close supervision and monitoring of the patient's lying and standing blood pressure to record the presence of a postural drop is needed.

Smoking Status

A change in smoking status can have an adverse effect on the patient's clozapine blood levels. Dose adjustment may be necessary as abrupt cessation of smoking may lead to clozapine intoxication. Patients that smoke should be informed that if they decide to stop smoking, they are encouraged to do so but must inform their nurse or doctor.

6.4 Management of side effects

Clozapine treatment has well documented side effects, some of which are life threatening. All adverse events, whether expected or unexpected, should be reported immediately to the Therapeutic Goods Administration (and in no case later than three working days after the reaction) in the form of a detailed 'blue card' format case summary. Copies of the 'blue card' (*Report of Suspected Adverse Reaction to Drugs and Vaccines*) are available at www.tga.gov.au/adv/bluecard.htm

A list of some side effects, as well as the time course and action, has been included on page 4. The action section includes both medical and nursing responses that can be used if an event occurs.

Management of side effects associated with clozapine therapy*		
Side effect	Time course for onset	Recommended actions
Neutropenia / Agranulocytosis	First 18 weeks (but may occur at any time)	Refer to <i>Clozapine Blood Results Monitoring System</i> table on page 3. Admit to hospital if agranulocytosis is confirmed. Symptoms may include a sore throat or fever.
Myocarditis / Cardiomyopathy	Myocarditis - within 6-8 weeks of starting Cardiomyopathy - may occur at any time	Cease clozapine. Admit to hospital if myocarditis or cardiomyopathy is confirmed. May present with flu-like symptoms.
Constipation	Usually persists	Potentially life threatening therefore effective treatment or prevention of constipation is essential. Recommend high-fibre diet. Use bulk forming laxatives and stimulants.
Sedation	First few months May persist, but usually wears off	Give smaller dose in the morning. Reduce dose if necessary - check plasma level.
Hypersalivation	First few months Very troublesome at night	Manage according to severity of symptoms. See literature for pharmacological options.
Hypotension	First 4 weeks	Reduce dose or slow down rate of increase. Advise consumer to slowly stand up from a lying or sitting position.
Hypertension	First 4 weeks, but sometimes longer	Increase dose slowly. Hypotensive therapy may be necessary.
Tachycardia	First 4 weeks, but sometimes persists	Common in early stages. If persistent at rest and associated with fever, hypotension or chest pain may indicate myocarditis. Refer to cardiologist.
Weight gain	Usually during the first year of treatment	Ensure dietary counselling before weight gain occurs.
Fever	First 3 weeks	Give antipyretic, perform urgent FBC and cardiac enzymes. Seek urgent medical review.
Seizures	May occur at any time	Consider prophylactic valproate if on high dose or with high plasma level.
Nausea	First 6 weeks	May give anti-emetic. Avoid prochlorperazine and metoclopramide if caused previous Extra Pyramidal Side Effects. Consider Gastro Oesophageal Reflux Disease (GORD).
Nocturnal enuresis	May occur at any time	Review dose schedule. Avoid fluids before bedtime. Seek Medical Review.
This is not an exhaustive list of side effects. Please see product information for further advice.		

* Modified from: Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines. 10th ed. London(UK):Informa Healthcare UK Ltd; 2009.

Appendix A: Guidelines for withholding medicines

The *National Adult Clozapine Titration Chart* (NACTC) is a legal document and therefore must be written in a clear, legible and unambiguous form.

Every nursing officer has a responsibility to ensure they can clearly read and understand the order before administering any medicines. For **all** incomplete or unclear orders, the doctor should be contacted for clarification.

Never make any assumptions about the prescriber's intent.

Every NACTC **must have** the patient's identification details completed.

Every clozapine order must be complete and include:

- Date
- Route (Oral pre-printed)
- Generic drug name (Clozapine pre-printed)
- Dose ordered in metric units & Arabic numerals (mg pre-printed)
- Frequency (Morning and Evening pre-printed)
- Times (0800 and 2000 are pre-printed)
- Medical officer's signature

It is appropriate to withhold the medicine:

- If there is a known allergy or adverse drug reaction (ADR) to clozapine.
- If the NACTC is full (i.e. there is no space to sign for administration) then the medication order is not valid. The NACTC must be re-written as soon as possible.

Generally medicines should not be withheld if the patient is pre-operative or nil by mouth (NBM) / fasting unless specified by the medical officer.

Related resources

National Safety and Quality Health Service Standards 2011
www.safetyandquality.gov.au/our-work/accreditation/nsqhss/

National Standards for Mental Health Services 2010
www.health.gov.au/internet/main/publishing.nsf/Content/mental-pubs-n-servst10

National Recommendations for Terminology, Abbreviations and Symbols to be used in the Prescribing and Administering of Medicines
www.safetyandquality.gov.au/publications/national-terminology-abbreviations-and-symbols-to-be-used-in-the-prescribing-and-administering-of-medicines-in-australian-hospitals/).